INITIAL TRAINING CURRICULUM

KY Required Mandatory Supplemental Curriculum for Emergency Medical Technician Basic (EMT-B) Initial Training in Advanced Airway Management

INSTRUCTOR MANUAL

Instructions for the EMT-B Student Preparatory to Meeting the Scope of Practice and Requirements for KY EMT-B Certification

Kentucky Board of Emergency Medical Services
Pursuant to 202 KAR 7:060 and 7:080

This curriculum is a modification of the Department of Transportation (D.O.T.) 1994 EMT Basic National Standard Curriculum from the Module 8 Elective Advanced Airway Management component, and is designed as a KY required Supplemental curriculum referenced in 202 KAR 7:060 and 7:080.

INTRODUCTION

Accurate assessment and management of the airway is critical to the survival of an illness or injury. Often the patient with an airway compromise requires advanced airway management. This section is designed to prepare the EMT-Basic (EMT-B) student to have a working knowledge of advanced airway placement and maintenance while working with another Advanced Life Support (ALS) provider who is certified to perform endotracheal intubation. **While the EMT-B in practice shall not be authorized to insert an endotracheal airway, practice of the procedure in the classroom setting will be for the purpose of appreciating the skill which will be performed by ALS practicing health professionals in direct patient care. This training will better prepare the EMT-B to assist ALS personnel in maintaining the airway in place, while allowing the ALS person to perform additional patient care procedures.**

This is a minimum of 1.0 Lecture and 2.0 Skill hours of training in Advanced Airway Management for the Emergency Medical Technician Basic. Performance of the advanced airway skill will be ambulance service specific and the training is primarily designed for EMT's to assist an ALS provider in patient care. The skill is directly related to Medical Director oversight.

This curriculum is a <u>mandatory, KY required Module to be included in KY EMT-B initial training courses commencing with the effective date of 202 KAR 7:060 and 7:080</u>. For an EMT-B to obtain training through continuing education, this curriculum, or an equivalent curriculum, that <u>has been submitted to, reviewed and recommended to the Kentucky Board of Emergency Medical Services for approval, is to be used</u>. Training through continuing education is for a person who received their initial EMT-B training prior to the introduction of this curriculum as a regulatory requirement in a KY EMT-B initial training course

<u>OBJECTIVES:</u>

<u>Cognitive</u>

1. The student shall be able to list the equipment needed for orotracheal intubation.
2. The student shall describe the proper use of both the curved and straight blades for orotracheal intubation.
3. The student shall be able to state the reason for using the stylet in orotracheal intubation.

4. The student shall be able to describe how to select the proper-size endotracheal tube for an adult, child, and infant.
5. The student shall be able to list the complications associated with advanced airway management.

Psychomotor

1. The student shall be able to demonstrate correct confirmation of an endotracheal tube placement in the adult, child, and infant.
2. The student shall be able to demonstrate correctly how to secure an oral endotracheal tube in the adult, child and infant.

WORK ENVIRONMENT: With service having written agreement with physician Medical Director.

LEAD INSTRUCTOR QUALIFICATIONS: Minimum, KY EMT-B Instructor. If this person does not additionally have ALS credentials, an adjunct faculty holding current ALS credentials may need to be recruited to teach this lesson based on this curriculum.

RECOMMENDED MINIMUM TIME TO COMPLETE: Three (3) hours, which includes one (1) hour Lecture and two (2) hours skills.

EQUIPMENT:

Adult Airway Mannequin
Child Airway Mannequin
Infant Airway Mannequin
Laryngoscope Handle
Straight Laryngoscope Blades (assorted sizes)
Curved Laryngoscope Blades (assorted sizes)
ET tubes (assorted sizes)
Stylets (assorted sizes)
10 ml Syringe
Magill Forceps
Twill Tape or other suitable Securing Device
Silicone Spray
Gloves (assorted sizes)
Suction Unit with tubing
Hard Tip Suction Catheter
Rubber Suction Catheters (assorted sizes)
Personal Eye Protection (goggles)
Towels

OVERVIEW

I. Describe the basic Airway Anatomy.
- A. Nose and Mouth
- B. Pharynx
  1. oropharynx
  2. nasopharynx
- C. Epiglottis
- D. Trachea
- E. Cricoid cartilage
- F. Larynx
- G. Carina
- H. Bronchi
- I. Lungs
  1. Alveoli
  2. Pulmonary Capillary

II. Describe the Equipment used in endotracheal intubation.
- A. Body substance isolation
  1. Gloves
  2. Mask
  3. Goggles
- B. Laryngoscope handle
  1. Battery powered
     a. the need for spare batteries
     b. the need for spare bulbs
  2. Locking bar
- C. Laryngoscope blades
  1. Straight Blade
     a. assorted sizes (0-4)
     b. lift the epiglottis to allow visualization of the glottic opening and vocal cords
     c. the straight blade is preferred in children and infants
  2. Curved Blade
     a. assorted sizes (0-4)
     b. inserted into the vallecula to allow visualization of the glottic opening and vocal cords
  3. Assembly
     a. notch on blade locks onto locking bar of laryngoscope handle
     b. lifting the blade up locks it into place and illuminates light
     c. check light. It should be “bright, white, and tight.” Spare bulbs should be available

D. Endotracheal tubes
   1. Assorted sizes of endotracheal tubes should be available.
      a. average sizes for adult male 8.0 – 9.0
      b. average sizes for adult female 7.0 – 8.0
   2. Helpful to have one tube larger and one tube smaller available than estimated size.
   3. Components
      a. 15 mm adapter – allow attachment of bag valve mask
      b. Pilot balloon – verifies that cuff is inflated
      c. Cuff – holds approximately 5 - 8 cc of air
         1. should be inflated until there is no leak of air around the endotracheal tube
         2. infant and child endotracheal tubes are uncuffed (used in patients less than eight years old)
      d. Murphy eye – small hole on left side across from the bevel that decreases chance of obstruction
      e. Length of tube for adult – 33 cm
      f. Helpful hints – average adult
         1. 15 cm to cords
         2. 20 cm teeth to sternal notch
         3. 25 cm to carina

E. Stylet
   1. Malleable rod that is inserted into the endotracheal tube to provide stiffness and shape of the tube.
   2. Consider lubrication to allow for easy removal.
   3. Once inserted, the stylet should be used to form a “hockey stick” shape for the endotracheal tube.
   4. Should not be inserted beyond the Murphy’s eye. Best if kept ¼ inch from the cuff, or proximal end of Murphy’s eye.

F. Water soluble lubrication
   1. Applied to the end of the endotracheal tube for ease of insertion
   2. Applied to end of stylet for ease of removal

G. 10 ml syringe
   1. Used to test the cuff prior to insertion of the endotracheal tube
   2. Used to inflate the cuff once tube has been placed

H. Securing device
   1. there are a number of securing devices available, including tape and commercial devices
   2. Medical Director should approve taping technique or use of commercial device
   3. Should have oral airway or similar device as a bite block

I. Suction Unit
   1. Immediately available to clear any fluid or particulate debris
   2. A large bore catheter is needed to suction during intubation
   3. A rubber catheter maybe used after intubation to suction the tube

J. Towels
    1. May be helpful to raise the patient's shoulders or occiput to align the patient's airway during intubation

III. Technique for assisting with the insertion of an adult oral intubation
A. Assure PPE.
B. Assemble and test all equipment, including preparation for securing the tube.
C. Assure adequate artificial ventilation by bag-valve mask with high flow oxygen.
    1. Patient must be hyperventilated at a rate of 24 breaths/minute prior to any intubation attempt
D. Align the patient's head to assure ease of visualization.
    1. Unless trauma is suspected, tilt the head back, lift the chin
    2. In a trauma patient, maintain in-line immobilization and neck in a neutral position
E. If using a Curved blade:
    1. With the laryngoscope in the left hand, enter the mouth from the right and sweep the tongue over to the left
    2. Advance the tube through the right corner of the mouth and, while visualizing the cords, pass the tube through the cords
F. If using a Straight blade:
    1. Insert the blade directly to the epiglottis and expose the cords
    2. Advance the tube through mouth and, while visualizing the cords, pass the tube through the cords
G. Application of the Selleck maneuver during attempts at visualization may be helpful.
    1. Cricoid pressure should be used if you suspect that the patient may vomit
    2. Thyroid pressure may be used to assist in visualization of the cords
H. Remove stylet (if applicable)
I. Inflate the cuff with 5-8 cc of air and remove syringe.
J. Continue to hold the endotracheal tube until secured.
K. Have partner attach the bag-valve mask and deliver artificial ventilation.
L. Confirm placement
    1. Remember that visualization of the tube passing through the cords is the only true way of confirming placement. All other methods are for verification
    2. Rise and fall of the patient's chest
    3. Carbon dioxide detectors
    4. Auscultate breath sounds
        a. begin over the epigastrium. No sounds should be heard during artificial ventilation
        b. listen to the left base, compare with the right base. Breathing sounds should be equal and bilateral

c. listen to the left apex, compare with the right apex, breathing sounds should be equal and bilateral

5. Other methods
   a. pulse oximetry
   b. 60 cc syringe aspiration
   c. patient becomes more combative

M. If breath sounds are bilaterally equal, and no sounds are heard in the epigastrium, the endotracheal tube should be secured in place using tape or a medical director approved commercial device.
   1. The patient should then be artificially ventilated at an age appropriate rate
   2. Remember to note the distance that the tube has been inserted
   3. An oral airway may be inserted to act as a bite block

N. If breath sounds are diminished or absent on the left, most likely a right main stem intubation has occurred.
   1. Deflate the cuff, gently withdraw the tube while artificially ventilating the patient, and auscultating over the left chest
   2. Take care not to completely remove the endotracheal tube
   3. Compare the right and left breath sounds. If bilaterally equal, follow the previous direction regarding inflation of the cuff, secure the tube, and artificially ventilate the patient

O. If sounds are only present in the epigastrium, an esophageal intubation has occurred.
   1. An unrecognized esophageal intubation can be fatal
   2. Deflate the cuff and remove the tube
   3. Hyperventilate the patient for an additional 2-5 minutes prior to the second intubation attempt
   4. Be prepared to suction during endotracheal tube removal

P. Be sure to reassess breath sounds following every major move: (from the scene to the EMS unit, from the EMS unit into the receiving facility.

IV. Oral intubation complications
   A. Heart rate should be continuously monitored. Stimulation of the airway may cause slow heart rates.
   B. Soft tissue trauma to lips, teeth, tongue, gums, and other airway structures.
   C. Prolonged attempts may lead to inadequate oxygenation.
   D. Right main stem intubation
   E. Esophageal intubation
   F. Vomiting
   G. Self extubation
   H. Be sure to reassess chest wall motion, breath sounds following every major move of the patient.

V. Endotracheal Tube Sizing for the Pediatric Patient
   A. Assorted sizes of endotracheal tubes should be present.
      1. Determining the size of tube
         a. length based resuscitation tape
         b. size averages
            1. 3.0 – 3.5 for newborns and small infants
            2. 4.0 and up for 1 year and older
      2. Formula: 16 + age in years divided by 4
      3. Alternative sizing
         a. diameter of little finger
         b. diameter of nostril
         c. helpful to have one tube larger and one smaller than estimated size available
      4. Uncuffed tubes are used in patients less than 8 years old. The circular narrowing at the level of the cricoid cartilage serves as a functional cuff
      5. Cuffed tubes should be used for children older than 8 years old
      6. Helpful hints:
         a. 6 months to 1 year – 12 cm teeth to midtrachea
         b. 2 years to 4 years – 14 cm from teeth to midtrachea
         c. 4 years to 6 years – 16 cm from teeth to midtrachea
         d. 6 years to 10 years – 18 cm from teeth to midtrachea

VI. Laryngoscope blades for pediatric patients
   A. Straight blades
      1. is preferred in infants
      2. provides greater displacement of the tongue
      3. provides greater visualization of the glottis
      4. lifts the epiglottis to allow visualization of the glottic opening and vocal cords
   B. Curved blades
      1. is preferred in older children
      2. inserted into the vallecula to allow visualization of the glottic opening and vocal cords

VII. Technique for Assisting with the Insertion of an Infant or Child Endotracheal Tube

A. Assure PPE

B. Assemble and test all equipment, including preparation for securing the tube.

C. Assure adequate artificial ventilation by bag valve mask with high flow oxygen.

1. Patient must be hyperventilated at a rate of 24 breaths per minute prior to any intubation attempt.

D. Align the patient's head to assure ease of visualization.

1. Unless trauma is suspected, tilt the head back, lift the chin.
2. In a trauma patient, maintain in-line immobilization and neck in a neutral position.

E. Application of the Selleck maneuver during attempts at visualization may be helpful.

F. ALS provider will attempt intubation

G. Remove stylet (if applicable).

H. Inflate the cuff (if applicable) and remove syringe.

I. Continue to hold the endotracheal tube until secured.

J. Have partner attach the bag-valve mask and deliver artificial ventilation.

K. Confirm placement.

1. Remember that visualization of the tube passing through the cords is the only true way of confirming placement. All other methods are for verification.
2. Rise and fall of the patient's chest.
3. Carbon dioxide detectors.
4. Auscultate breath sounds
   a. begin over the epigastrium. No sounds should be heard during artificial ventilation
   b. listen to the left base, compare with the right base, breathing sounds should be equal and bilateral
   c. listen to the left apex, compare with the right apex, breathing sounds should be equal and bilateral
   d. listen at the sternal notch
5. Other methods:
   a. pulse oximetry
   b. patient becomes more combative

L. If breath sounds are bilaterally equal, and no sounds are heard in the epigastrium, the endotracheal tube should be secured in place using tape or a Medical Director approved commercial device.

1. the patient should then be artificially ventilated at an age appropriate rate
2. remember to note the distance that the tube has been inserted
3. an oral airway may be inserted to act as a bite block

M. If breath sounds are diminished or absent on the left, most likely a right main stem intubation has occurred.
   1. deflate the cuff and gently withdraw the tube while artificially ventilating and auscultating over the left chest
   2. take care not to completely remove the endotracheal tube
   3. compare the right and left breath sounds, if bilaterally equal, follow the previous direction regarding inflation of the cuff (if applicable)
   4. secure the tube and artificially ventilate the patient

N. If sounds are only present in the epigastrium, an esophageal intubation has occurred.

1. an unrecognized esophageal intubation is fatal

2. deflate the cuff (if applicable) and remove the tube and hyperventilate the patient for an additional 2-5 minutes prior to the second intubation attempt

O. Be sure to reassess breath sounds following every major move (from the scene to the EMS unit, from the EMS unit into the receiving facility).

APPENDIX

EMT-BASIC CURRICULUM
VENTILATORY MANAGEMENT

EMT-B Advanced Airway Assisted Skills

SAMPLE **GUIDELINE** **SAMPLE**

For Development of
Form for Skill Station Evaluation

Advanced Airway Assisted Skills

Please Print or Type:

_____	_____	_____	_____
Name of Student	Name of Training Agency	Location (City)	Date

	Possible Points	Points Awarded
Time Required to Complete _____		
Time Used by Student _____		
Takes or Verbalizes PPE/BSI	1	_____
Opens Airway Manually	1	_____
Elevates Tongue and Inserts Simple Airway (Oropharyngeal / Nasopharyngeal)	1	_____
Ventilates the Patient with BVM with Room Air	1	_____
Ventilates the Patient with BVM with High Flow Oxygen	1	_____
Selects Correct Size Tube (Adult 7.5-9.0)	1	_____
Checks Endotracheal Cuff for Leak	1	_____
Checks Laryngoscope Operation and Bulb Tightness	1	_____
Assists with the Sellick Maneuver	1	_____
Inflates the Cuff to the Accurate Pressure and Disconnects the Syringe	1	_____
Confirms Accurate Placement by Asculation Bilaterally and over Epigastrum	1	_____
Confirms Accurate Placement by Syringe Aspiration	1	_____

- Over -

Advanced Airway Assisted Skills (continued)

	Possible Points	Points Awarded
Confirms Cm# at Teeth or Gum Line	1	_____
Secures the Endotracheal Tube in Place	1	_____
	_____	_____
Total	14	

Minimum Number of Points required To Pass Skill Station (% competency). In addition, No Critical Criteria Not Met Total 10? (or whatever required points)

NOTE* If Training Program Requires a Minimum Skill Competence rating of 80% - (80% of 14 rounded to nearest whole number is 11; if 90%, 90% of 14 = 13 minimum number of points to pass)

Critical Criteria (Check only those Not Met)

_____ Did not Take or Verbalize PPE/BSI as Required for Procedures
_____ Did not Hyperventilate the Patient before Intubation
_____ Did not Provide High Flow Oxygen
_____ Did not Select the Correct Size Tube
_____ Did not Evaluate Operability or Availability of Appropriate Type of Equipment
_____ Did Not Meet Critical Criteria Requirements within Established Time Limit